

- CONFIDENTIAL
1. An optical subassembly, comprising:
 - an optical device having a planar surface;
 - a substrate having an upper surface and a plurality of pits; and
 - a positioning mechanism disposed in each said pit, wherein said optical device contacts said positioning mechanisms and is positioned on said substrate such that said planar surface is tilted relative to said upper surface.
 2. The optical subassembly of claim 1, wherein each said positioning mechanism comprises a column.
 3. The optical subassembly of claim 1, wherein each said positioning mechanism comprises a sphere.
 4. The optical subassembly of claim 3, wherein at least one of said spheres is a different size than the remainder of said spheres.
 5. The optical subassembly of claim 1, wherein said optical device includes one or more grooves, said optical device grooves being sized and configured to receive at least one of said positioning mechanisms.

6. The optical subassembly of claim 5, wherein at least one of said optical device grooves is located on a different surface of said optical device than the remainder of said optical device grooves.
7. The optical subassembly of claim 5, wherein said one or more optical device grooves extend perpendicular to an optical axis of said optical device and said upper surface of said substrate.
8. The optical subassembly of claim 1, further comprising a lateral adjustment mechanism for laterally positioning said optical device on said substrate.
9. The optical subassembly of claim 8, wherein said lateral adjustment mechanism comprises one or more spheres.
10. The optical subassembly of claim 8, wherein one or more edges of said optical device are at transverse angles with an optical axis of said optical device, said one or more edges abutting said lateral adjustment mechanism.
11. The optical subassembly of claim 1, wherein said optical device includes at least one flexure portion.
12. An optical subassembly, comprising:
an optical device having at least one cut-out portion;

a substrate having an upper surface and a plurality of pits; and
a positioning mechanism disposed in each said pit, wherein said positioning
mechanisms contact said at least one cut-out portion.

13. The optical subassembly of claim 12, comprising a plurality of cut-out portions each contacting a respective said positioning mechanism.
14. The optical subassembly of claim 13, wherein at least one of said cut-out portions is located on a different surface of said optical device than the remainder of said cut-out portions.
15. The optical subassembly of claim 13, wherein said cut-out portions comprise pits.
16. The optical subassembly of claim 13, wherein said cut-out portions comprise grooves.
17. The optical subassembly of claim 16, wherein said grooves extend in a direction perpendicular to said upper surface.
18. The optical subassembly of claim 16, wherein said grooves extend in a direction parallel to said upper surface.

19. An optical subassembly, comprising:

a substrate having an upper surface and a plurality of pits;

an optical device having a pair of opposing long surfaces and a pair of opposing edge surfaces;

a lateral adjustment mechanism for laterally positioning said optical device on said substrate, wherein one or more edges of said optical device are at transverse angles with an optical axis of said optical device, said one or more edges abutting said lateral adjustment mechanism; and

a plurality of spheres each being disposed within a respective said pit, wherein said optical device is positioned on said spheres.

20. The optical subassembly of claim 19, wherein said lateral adjustment mechanism comprises one or more spheres.

21. The optical subassembly of claim 19, wherein said pits are disposed on said upper surface in a predetermined pattern.

22. The optical subassembly of claim 19, wherein at least one of said spheres is of a different size than the remainder of said spheres.

23. The optical subassembly of claim 19, wherein said optical device includes a plurality of cut-out portions sized and configured to receive at least one of said spheres.

24. The optical subassembly of claim 23, wherein at least one of said cut-out portions is located on a different surface of said optical device than the remainder of said cut-out portions.
25. The optical subassembly of claim 23, wherein said cut-out portions comprise pits.
26. The optical subassembly of claim 23, wherein said cut-out portions comprise grooves.
27. The optical subassembly of claim 26, wherein said grooves extend in a direction perpendicular to said upper surface.
28. The optical subassembly of claim 26, wherein said grooves extend in a direction parallel to said upper surface.
29. The optical subassembly of claim 19, wherein said optical device includes at least one flexure portion.
30. A method for positioning an optical device on an upper surface of a substrate, said method comprising:
mounting a plurality of positioning mechanisms in predetermined locations on said substrate;

mounting an optical device having a planar surface on said positioning mechanisms wherein said planar surface is tilted relative to said upper surface; and anchoring the optical device.

31. The method of claim 30, wherein said mounting of a plurality of positioning mechanisms in predetermined locations comprises positioning a plurality of spheres on said upper surface of said substrate.
32. The method of claim 31, further comprising forming a plurality of pits on said upper surface of said substrate, said pits being sized and configured to receive said spheres.
33. The method of claim 30, wherein said anchoring comprises affixing the optical device to the substrate.
34. The method of claim 33, wherein the optical device and the substrate include metal, said affixing comprising soldering the optical device to the substrate.
35. The method of claim 30, wherein said anchoring comprises affixing the optical device to at least one of the positioning mechanisms.

36. The method of claim 35, wherein the optical device and the positioning mechanisms include metal, said affixing comprising soldering the optical device to the at least one of the positioning mechanisms.

37. A method for positioning an optical device on an upper surface of a substrate, said method comprising:

mounting a plurality of positioning mechanisms in predetermined locations on said substrate;

forming at least one cut-out portion on an optical device;

mounting said optical device on said substrate such that said at least one cut-out portion contacts at least one said positioning mechanisms; and

anchoring the optical device.

38. The method of claim 37, wherein said forming comprises forming a plurality of pits sized and configured to receive said positioning mechanisms.

39. The method of claim 38, wherein said forming comprises forming at least one of said optical device pits on a different surface of the optical device than the remainder of the optical device pits.

40. The method of claim 37, wherein said forming comprises forming a plurality of grooves sized and configured to receive said positioning mechanisms.

41. The method of claim 40, wherein said forming comprises forming said grooves to extend perpendicular to an optical axis of the optical device and the upper surface of the substrate.